

STUDIES ON DIOPSIDAE (DIPTERA)

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(With one plate and six text-figures.)

THE Stalk-eyed Flies have from time to time attracted the attention of many systematists, but since no critical revision of the whole group has been completed during the last century the literature is confused, and of the 160 species named many must be regarded as synonyms.

For present purposes it is regarded as most expedient to treat the Diopsidae as a family and to recognize eight genera; the following short formal definition suffices to distinguish this family from others:

MUSCIDAE-ACALYPTERAE, in which the head is produced laterally in both sexes; not only the eyes but also the antennae are borne on these processes ("eye-stalks"). The thorax bears two, sometimes three, pairs of spines.

Full keys indicating the position of this family are to be found in the works of Imms (1938), Curran (1934), Lindner (1925), Hendel (1922), etc. A more detailed subdivision of the Acalypterae has been given by Frey (1921), basing his system on the structure of the mouth-parts. In his scheme Diopsidae were placed in the Sciomyzaeformes, close to the families Sepsidae and Megamerinidae. This agreed with a system suggested by Hendel (1916), who later (1922) grouped these three families together as Sepsoidea-Sepsaridae.

This paper is intended to serve as an introduction to a series of papers at present in preparation, in which the species of Diopsidae will be systematically revised and their nomenclature brought up to date. The first part reviews the most important contributions to our knowledge of these insects and the determination of the genera, and in the second part the genus *Cyrtodiopsis* Frey is revised and extended.

I. THE FAMILY DIOPSIDAE.

(i) HISTORICAL SURVEY OF TAXONOMY.

The genus *Diopsis* was established by Linnaeus (1775) for his single species, *D. ichneumonea*; he pointed out that despite its apparent affinities with various Hymenoptera, it must belong to the Diptera. Shortly afterwards further species were described by Dalman (1817) and others, and were placed in this genus.

Fabricius (1805) established a new genus of Stalk-eyed Flies, *Achias*, which fell within the original definition of *Diopsis* Linn.—"capite bicorni, oculis terminalibus"—but from which it can readily be separated by the position of the antennae on the eye-stalks. The original distinction in the form of the antennae given by Fabricius was not correct; in his key (*loc. cit.*, p. 13) *Achias* is placed in the section "Antennis parum articulatis deflexis" while *Diopsis* is quite unjustifiably placed in the section "Antennis minutis uniarticulatis."

Say (1817) described as *D. brevicornis* an American species which was apparently an intermediate form and which was not infrequently regarded as

an *Achias*, but for which Say himself later (1828) erected, as a new genus, *Sphyracephala*, adding to his definition, "to be placed between *Diopsis* Linn. and *Achias* Fab."

One of the earliest attempts at forming natural groups of these genera was by Billberg (1820) in the catalogue of insects in his collection; he arranged a group ("natio") Diopsides consisting of four genera, *Loxocera*, *Calobata*, *Achias* and *Diopsis*, placing it between similarly constituted groups, Muscaedes and Conopsides.

The first comprehensive account of these insects was that of Westwood (1837), in which he gave an excellent summary of both the historical and morphological aspects of the genus *Diopsis*, to which he added several new species, making a total in his list of 31 species. On the status of *Sphyracephala*, however, he did not give a decided opinion, though later (1848) he adopted the name, not however without some misgivings.

In his first paper, which preceded Westwood's memoir, Macquart (1835) separated *Achias* from *Diopsis*, grouping the former with the Muscidae and the latter with the Sepsidae. Later (1843) he pointed out that this grouping was for convenience only and that he regarded the differences as sufficient to justify the erection of a new tribe Diopsidae, though in later papers he did not carry out his other projected modifications.

Walker (1856, etc.) in his catalogues described some species of *Diopsis* and included them in a sub-family of his own creation, Diopsides, ignoring Billberg's use of this name.

Rondani (1875) published a key to nine genera of his sub-family ("stirps") Diopsidinae in which he grouped together all the Stalk-eyed Flies—"character communi capitis ad latera in pedunculo ocelliferos sat aut valde producti"—and Bigot (1880), in his second and more important paper on these insects, followed this principle and added two further new genera. An interesting contrast is afforded by a more modern interpretation of the affinities of the genera then grouped together (Table I):

TABLE I.—*Classification of Stalk-eyed Flies included in the DIOPSIDINAE of Rondani and Bigot.*

I. Genera still retained in DIOPSIDAE :

Diopsis Linnaeus.

Sphyracephala Say.

Synonyms : *Hexechopsis* Rondani.

Zygocephala Rondani.

Teleopsis Rondani.

Diasemopsis Rondani.

II. Genera now assigned to other families :

Achias Fabricius and its synonym *Plegiocephala* Rondani in ORTALIDAE.

Zygothrica Rondani in DROSOPHILIDAE.

Laglaisia Bigot in ORTALIDAE.

Anaeropsis Bigot in MICROPEZIDAE.

N.B.—*Achias* (*s. str.*) excludes at least two species originally placed in that genus but now grouped with different genera in Trypetidae, namely, *Achias maculipennis* Westwood (now *Themara*) and *A. ichneumonaea* Westwood (now *Pelmatops*). In addition to the genera mentioned above, stalk-eyed flies have been described in the following genera of Ortalidae : *Paragorgopsis*, *Richardia*, *Megalathoraca* and *Asyntona*.

Subsequent research having exposed the artificiality of Rondani's grouping, it was discontinued and the true Stalk-eyed Flies have latterly been treated either as a family, Diopsidae, or as a sub-family, Diopsinae, according to the status given to the Muscidae-Acalypterae.

Although no attempts have been made to revise the whole family, several important partial revisions have been published and new genera have been added since Bigot's time. Loew (1873) had produced a short summary of the small genus *Sphyracephala* and allocated to it a fossil species which he described from Baltic amber; his paper was the basis of Osten-Sacken's remarks (1882) on this genus, which in turn led to further revisions by Bezzi (1922) and by Curran (1928a) (African species only).

The South Asian species were catalogued by van der Wulp (1896) and this list was extended by Brunetti (1907); a later revision of the genera *Teleopsis* and *Sphyracephala* by this author was published posthumously (1928) by which time it was already more out of date than its editors had realized, for Hendel (1917) had recognized a fifth genus, *Pseudodiopsis* (for *Diopsis cothurnata* Bigot—till then grouped with *Sphyracephala* by Osten-Sacken, Brunetti, etc.).

Eggers (1915a) discussed the characters and relationships of the African genera and later (1925) published an important paper, again restricted to the African species, in which he summarized the literature relating to the region, gave a catalogue of species and concluded with a general discussion of the problem of "stalk-eyedness."

Frey (1928) gave a key in which he added the genera *Cyrtodiopsis* (for *D. dalmanni* Wiedemann) and *Megalabops* (for *D. quadriguttata* Walker) to the five genera already established.

Curran (1928b) established a genus *Diopsina* for a new species from Africa, and he also (1928c) published a key to the five African genera; in another paper (1931) he repeated this key to the genera (with one modification), and also gave a key to the species of *Diasemopsis* along with descriptions of fourteen new species.

Subsequently Curran (1934) extended his generic key, ostensibly to cover all the known genera and also a new genus *Microdiopsis*, which he immediately recognized as a synonym of *Pseudodiopsis* Hendel (*loc. cit.*, p. 495 in corrigenda), but he omitted *Megalabops* and *Cyrtodiopsis*.

At the present time the following eight genera may be regarded as well established:

Diopsis Linnaeus, 1775.

Sphyracephala Say, 1828.

Synonyms: *Hexecheopsis* Rondani, 1875.

Zygocephala Rondani, 1875.

Teleopsis Rondani, 1875.

Diasemopsis Rondani, 1875.

Pseudodiopsis Hendel, 1917.

Synonym: *Microdiopsis* Curran, 1934.

Cyrtodiopsis Frey, 1928.

Megalabops Frey, 1928.

Diopsina Curran, 1928.

The following suggestions have been made for subdividing these genera: Westwood (1837) classified the species in his genus *Diopsis* into four groups according to the wing pattern. Eggers (1925) extended this classification by

employing additional characters to form eight groups, mainly as an aid to identification and without in any way labelling these groups as sub-genera.

Frey (1928) however introduced a sub-genus, *Eurydiopsis*, for species of *Diopsis* (*s. str.*) having short, blunt teeth on the oral margin; Brunetti (1928) also suggested such a division, but hesitated to adopt the principle, since intermediate forms had been described. Curran (1931) also pointed out the possibility of dividing *Diasemopsis* in a similar manner.

(ii) GEOGRAPHICAL DISTRIBUTION.

Until fuller records, based on more accurate identification, are available, it is not possible to give more than the following rough outline of the distribution of the various genera:

Sphyracephala.—Both Old World (Ethiopian, Oriental and Palaearctic Regions) and North America (Nearctic Region). Also recorded in fossil form in amber (Oligocene-Palaearctic Region).

Diopsis, *Teleopsis* and *Megalabops*.—Oriental and Ethiopian Regions.

Diasemopsis and *Diopsina*.—Exclusively from the Ethiopian Region.

Cyrtodiopsis.—Oriental and Ethiopian Regions. (The only record from Africa is a new species described below, see p. 160.)

Pseudodiopsis.—Malay Archipelago and Ceylon (Oriental Region) and also Papua and New Guinea (Australian Region).

Our knowledge of the localities in which the last-mentioned genus is known to exist has been extended recently; Malloch (1938) has recorded a specimen from Mt. Lamington in Papua, but the following records have not hitherto been published:

1. Examination of the holotype of *T. bipunctipennis* Senior White (1922)—type locality Ceylon—has shown that this species is undoubtedly congeneric and possibly conspecific with *Pseudodiopsis cothurnata* (Bigot).

2. A series of specimens of *P. cothurnata* (now in the British Museum (Natural History)) was taken by Miss Cheesman in the Mount Cyclops region of Dutch New Guinea in 1932.

These records from the Australian region provide an interesting exception (the only one known to the writer) to the rule propounded by Osten-Sacken (1883) which relates to the distribution of the various stalk-eyed flies:

“New Guinea, with its dependencies is the home of the wonderful forms of *Achias*, *Anaeropsis* and *Laglaisia*, while *Diopsis*, so abundantly represented in South Eastern Asia (even in Celebes), has not yet been found in New Guinea.” (It is obvious that Osten-Sacken here means *Diopsis (sensu lato)*.)

(iii) STRUCTURE AND HABITS.

Very little has been published on this aspect of the Diopsidae; Eggers (1915*b*) gives a full account (in Russian with English translation) of histological studies on the eyes of Diopsidae, from which he concludes that the higher differentiation of the anterior cells gives the insect binocular vision of moving objects in front; those cells which are so situated that they cannot see objects in the field of view of the other eye are not so specialized. In this connection, it may be recalled that Wiedemann (1830) gave these flies the name “*Perspectiv-fliegen*.” Eggers implies that sexual differences are not observed in the eyes of Diopsidae.

Morphological studies of a more comparative nature include those of Peterson (1916) on the head of *Sphyracephala brevicornis* Say, of Young (1921) on the thorax and abdomen of the same species, and of Frey (1921) on the mouth-parts of *D. ichneumonea*, while Querner (1924) has dealt with the external morphology of the head in *D. apicalis* Dalmann.

Concerning the habits of Diopsidae, it is interesting to note that they are often found on windows, while the species from Transcaucasia described under the name of *Sphyracephala babadjanedesi* by Zaitzev (1919) was collected at a light; their normal habitat is the vegetation adjacent to streams. Species of *Sphyracephala* appear more especially to choose sunny rocks in streams, from which they have often been taken in large numbers; several observations collected by Sen (1921) tend to emphasise the gregarious nature of these flies.

Of their feeding habits nothing is known; Sen (*loc. cit.*) fed specimens on sugar solution, but it has generally been suggested that they are predaceous—a supposition based on the structure of the fore-femora but not confirmed by observation in the field. The structure of the eye-stalks and their function in providing binocular vision is discussed by Eggers (1915*b* and 1925) and is regarded by him as additional support for the predacity theory. Specimens have also been taken on human faeces by Gibbins in Uganda (MS. note with specimens—1935), but it was not recorded if they were actually feeding on them.

The first record of breeding habits was that of Mally (1920), who quoted several instances of specimens being bred from maize stalks but, in answer to the suggestion that Diopsid larvae are parasitic on maize stem-borers gave as his impression “. . . the larvae live in decaying vegetable matter such as is commonly left by floods on the banks of streams. The parent flies are probably attracted to maize stalks by decay induced by the borer.”

The details of the life-history of *Sphyracephala hearseiana* Westwood have been worked out by Sen (1921), who succeeded in rearing this insect under laboratory conditions. As his paper is rather inaccessible the following summary of his method is given here.

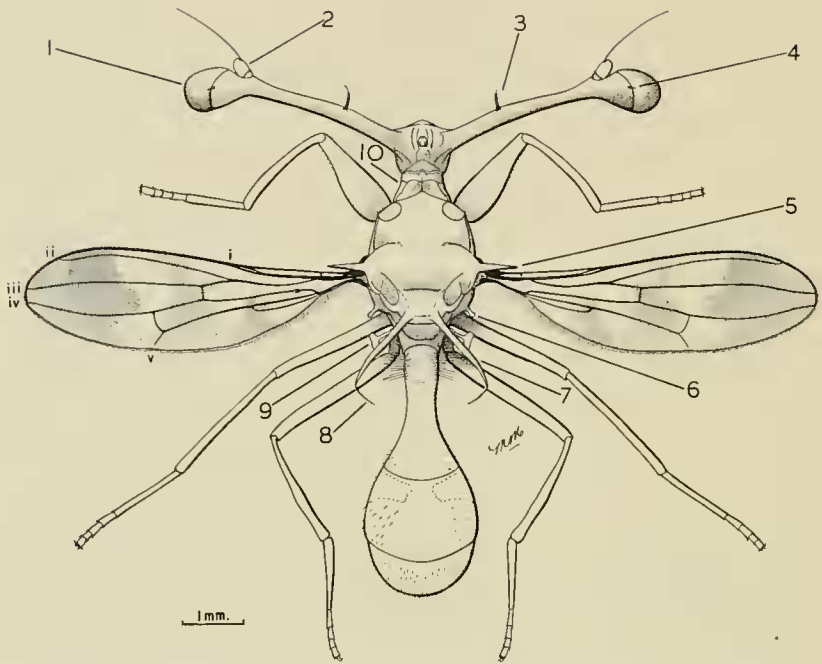
Several adults were placed in a glass jar, on the bottom of which was a layer of earth covered by a large quantity of grass—this was kept very wet; sugar solution was fed to the flies when necessary, the jar being kept in a shady place.

Under these conditions the eggs were laid on the grass about the tenth day and the remainder of the life-cycle took about three weeks; the larvae fed on the decaying vegetation and were found to be particularly susceptible to drying out.

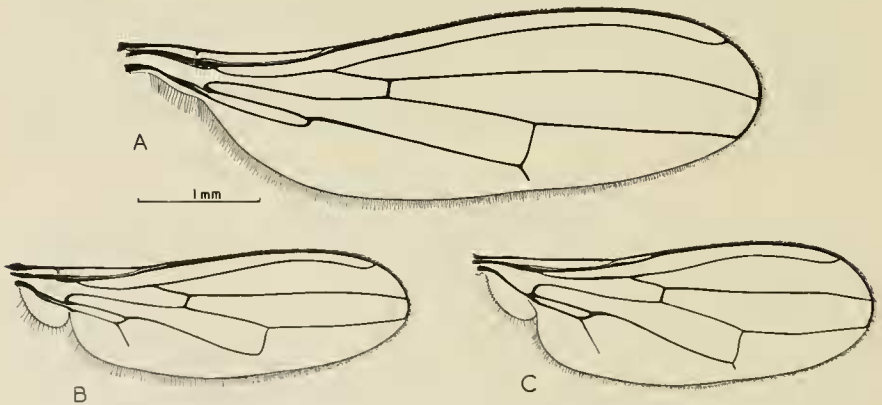
Sen also described the larval and pupal stages, paying special attention to the tracheal system, which he regarded as specially adapted to semi-aquatic conditions of life.

(iv) DETERMINATION OF THE GENERA.

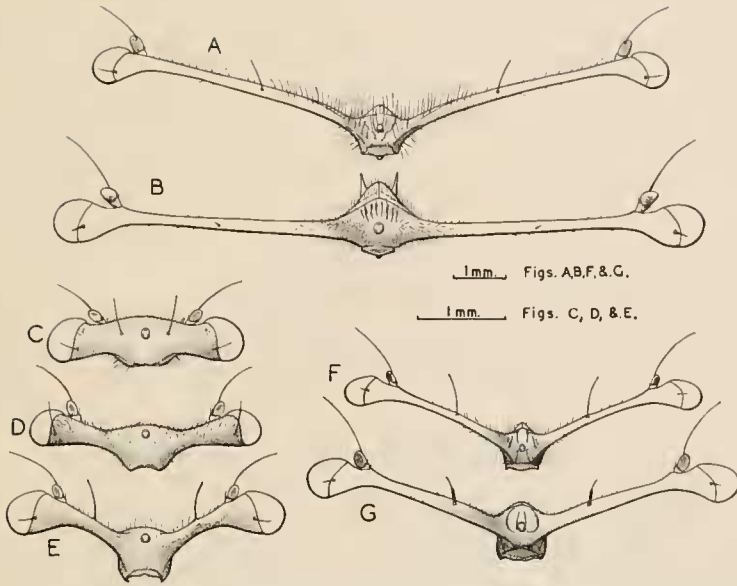
Generic distinctions in the Diopsidae are based on wing structure and on the ornamentation of the thorax. There has been considerable divergence in the nomenclature of spines and bristles, both in keys and in descriptions, and the lateral thoracic spines which have been variously called hypopleural, pteropleural, metathoracic, etc., are here classed as PLEUROTERGAL, following Young (1921) (see text-fig. 1, 6). Brunetti's term SUPRA-ALAR for the paired spines present only in species of *Teleopsis* and *Megalabops* is retained (see text-fig. 1, 5). Linnaeus (1775) had stated that such spines were not known



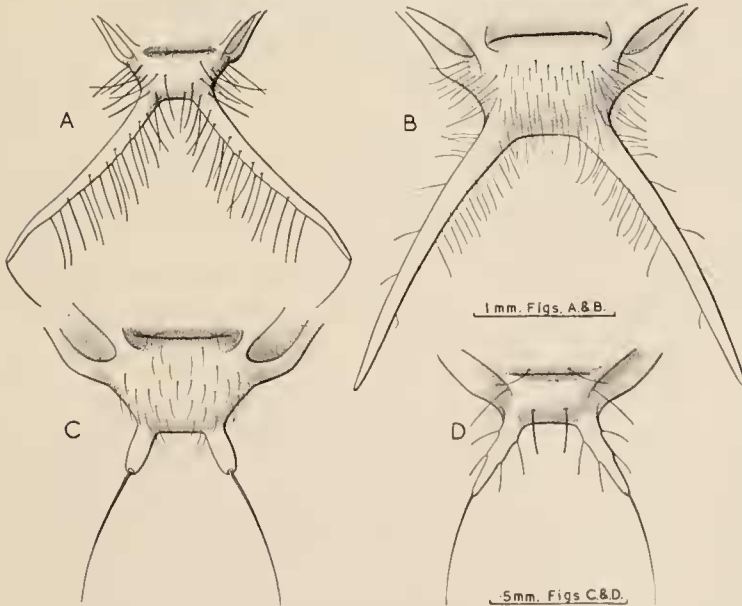
TEXT-FIG. 1.—*Teleopsis* sp., showing taxonomic characters. 1, Eye; 2, antenna; 3, inner orbital bristle; 4, outer orbital bristle; 5, supra-alar spine; 6, pleurotergal spine; 7, scutellar spine; 8, apical bristle; 9, haltere; 10, collar. i-v, longitudinal veins.



TEXT-FIG. 2.—Wings of Diopsidae to show venation (markings omitted).
A, *Diasemopsis*; B, *Pseudodiopsis*; C, *Sphyracephala*.



TEXT-FIG. 3.—Heads of Diopsidae. A, *Cyrtodiopsis*; B, *Diopsis* (slightly turned to show facial teeth); C, *Sphyracephala*; D, *Pseudodiopsis*; E, *Diasemopsis*; F, *Megalabops*; G, *Teleopsis*.



TEXT-FIG. 4.—Scutella of Diopsidae. A, *Cyrtodiopsis*; B, *Diopsis*; C, *Sphyracephala*; D, *Diopsina*.

in other Diptera, but it may be noted that scutellar spines occur in several genera of the Stratiomyiidae, and that species belonging to the genera *Ephippium* and *Negrilomyia* of the sub-family Clitellariinae also have well-developed supra-alar spines comparable with the spines characteristic of *Teleopsis*. The Asilid genera *Chrysopogon* and *Codula* are characterized by a pair of pre-sutural spiny bristles. Pleurotergal spines have, as far as can be ascertained, no counterpart in other families of Diptera.

Names for the bristles cannot be so accurately decided, but it would seem that the two pairs generally found are best described as NOTOPLEURAL and INTRA-ALAR. In *Diopsina* there may also be a pair of dorsocentral bristles, but the specimens of this genus now available for study are too badly damaged to enable a final decision to be made at the present time.

The following key was originally adapted from Frey's paper (1928) by Dr. John Smart of the British Museum (Natural History), and I am indebted to him for permission to include it here in a slightly modified form.

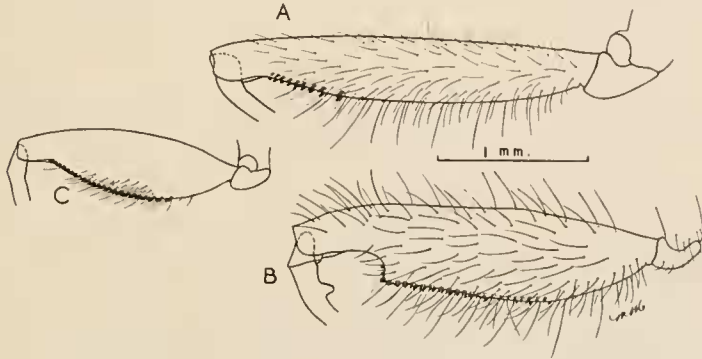
DIOPSIDAE—♂♂ AND ♀♀ (see text-figs. 1, 2, 3 and 4).

1. ALULA present; scutellar spines truncate and bearing a bristle which is much longer than the spine 2.
ALULA absent; scutellar spines long—their bristles, if present, short, not longer than the spine (in *Diopsina* spine and bristle are subequal) 3.
2. FIFTH VEIN extending beyond the discal cell (1st M₂); both inner and outer orbital bristles present SPHYRACEPHALA.
FIFTH VEIN not extending beyond the discal cell; only outer orbital bristles present PSEUDODIOPSIS.
3. THORAX with paired pleurotergal and supra-alar spines 4.
THORAX with paired pleurotergal but no supra-alar spines 5.
4. INNER ORBITAL BRISTLE set on a small tooth in the middle of the eye-stalks; supra-alar spines short MEGALABOPS.
INNER ORBITAL BRISTLE set on a truncate cone towards the base of the eye-stalks; supra-alar spines long TELEOPSIS.
5. THORAX bearing paired bristles on dorsum 6.
THORAX without paired bristles on dorsum 7.
6. SCUTELLUM truncate with a pair of discal bristles DIOPSISINA.
SCUTELLUM normal, without discal bristles DIASEMOPSIS.
7. BODY covered with coarse hairs; inner orbital bristle strong; scutellar spines markedly curved CYRTODIOPSIS.
BODY with but few sparse hairs; inner orbital bristle weak; scutellar spines not markedly curved DIOPSIS.

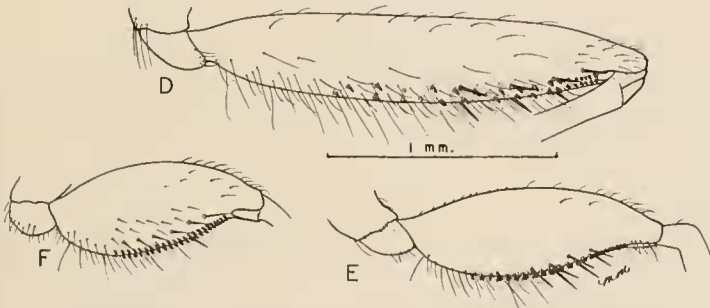
With the assistance of the figures illustrating characteristic features, undamaged specimens should be readily determined by this key, but valuable confirmatory evidence may be obtained by examining the fore-femora, either *in situ*, or preferably after clearing and mounting (text-fig. 5a and 5b). Various authors have made reference to the ornamentation of the fore-femora without apparently realizing the value of this character as a diagnostic feature in determining the genus—especially in differentiating between *Diopsis* (text-fig. 5a, A) and *Diasemopsis* (text-fig. 5b, D).

In all the Diopsidae examined by the writer, the ventral surface of the

fore-femora bears a double row of small peg-like teeth, which vary considerably in size and position in the different species. In addition to these, species belonging to *Diasemopsis*, *Sphyracephala* and *Pseudodiopsis* (text-fig. 5b) bear spiny bristles alongside the small teeth. Brunetti (1926) was therefore correct in assuming that his *Diopsis fuscivenis* would be more correctly grouped with *Diasemopsis*, while an examination of Bigot's cotypes of *D. dubia* has shown that this species too must be regarded as a *Diasemopsis* (cf. Brunetti (1928) and Curran (1931)).



TEXT-FIG. 5a.—Fore-femora of Diopsidae. A, *Diopsis*; B, *Cyrtodiopsis*; C, *Teleopsis*.



TEXT-FIG. 5b.—Fore-femora of Diopsidae (cont.). D, *Diasemopsis*; E, *Sphyracephala*; F, *Pseudodiopsis*.

All species of *Cyrtodiopsis* and some species of *Teleopsis* have distinctly hairy fore-femora, the hair being much coarser in the former than in the latter. The extraordinary specialized structure (text-fig. 5a, B) found on the fore tibiae and the corresponding modification of the femora of some males of *Cyrtodiopsis dalmanni* (Wiedemann) will be dealt with in a subsequent paper.

Owing to the damaged state of the type specimen of *Diopsina ferruginea* Curran (1928b) no description of the scutellar spines was given. Specimens from the British Museum (Natural History) were sent to Dr. Curran, who very kindly confirmed that they were congeneric; the drawing of the scutellum (text-fig. 4, D) was made from one of these specimens and a fuller description will be given later in this series.

The accompanying table (Table II) summarizes the data relating to chaetotaxy, the nomenclature of spines and the bristles of the fore-femora given above:

TABLE II.

Genus.	Orbital bristles.		Thoracic bristles.	Thoracic spines.			Fore-femora.
	Inner.	Outer.		Pleuro-tergal.	Supra-alar.	Scutellar.	
<i>Diopsis</i>	Weak	+ ¹	—	+	—	Simple	Without spiny bristles.
<i>Cyrtodiopsis</i>	Strong	+	—	+	—		
<i>Teleopsis</i>	Strong	+	—	+	+	With apical bristle which is not longer than the spine	With spiny bristles.
<i>Megalabops</i>	„	+	—	+	+		
<i>Diopsina</i>	Strong	+	SA, IA, ? DC	+	—	With spiny bristles on ventral surface.	
<i>Diasemopsis</i>	„ ²	+	IA always NP occasionally	+	—		
<i>Sphyracephala</i>	Strong	+	IA, NP	+	—	Apical bristle much longer than spine	
<i>Pseudodiopsis</i>	Absent	+	IA, NP	+	—		

IA, intra-alar; SA, supra-alar; NP, noto-pleural; DC, dorsocentral.

¹ Except *D. absens* Brunetti, in which the outer bristle is stated to be absent.

² Except *D. aethiopica* Rondani, in which the inner bristle is weak (*vide* Curran (1931)).

II. THE GENUS *CYRTODIOPSIS* FREY.

(i) TAXONOMY.

The only direct reference to this genus in the literature is its definition by Frey (1928) in his paper on the Philippine Diopsidae; the genus was defined in the key and a short note added about the "peg and hollow" structures of the fore-leg (see text-fig. 5, B) in certain males of *C. dalmani* (Wiedemann), the genotype.

A study of the literature and an examination of material in the British Museum (Natural History) has brought to light the following important facts:

1. *D. quinqueguttata* Walker and *D. villosa* Bigot belong to this genus; the description of the former (Walker, 1856) is characteristically inadequate, but the type is in good condition (in the British Museum) and shows the covering of hairs that is characteristic of this genus, which is so clearly emphasized by Bigot in his description of *D. villosa*—"Sparsim et undique villosa." The description of *D. villosa* contains the statement "ore bispinosa," whereas in fact Bigot's co-types (now in the collection of Mr. J. E. Collin) show no facial teeth and there is therefore no justification for separating these two species.

2. Curran (1936) was apparently unaware of Frey's paper, and two species mentioned in his paper, the one identified as *D. ferruginea* Roder (1893) and the other which he named *D. whitei* as a new species, both recognized by him as related to *D. dalmani* Wied., must also belong to *Cyrtodiopsis*.

Specimens agreeing well with the published data of both these species have been found mixed with *C. dalmani* in the British Museum. However it is quite obvious that the specimens referred by Curran (*loc. cit.*) to *D. ferruginea* Roder were misidentified, since that species, of which the writer has, through the courtesy

of Dr. W. Ludwig of the Zoologisches Institut, Halle, examined the type, belongs to *Megalabops* (as Frey (1928) suggested) and is not related to *dalmanni*. This species is re-described below as *C. currani* sp. n.

3. It is very surprising that Brunetti (1928) should have described a typical specimen of *C. dalmanni* (Wiedemann) as a new species, *Teleopsis truncata*, especially since he drew attention to that specialization in structure of the fore-leg which had been figured in previous accounts of *dalmanni*.

4. Also, in a collection of Diopsidae made by the author in Uganda, a new species has been found which must be attributed to this genus; this represents the first record of this genus from the African continent, the other species being exclusively from the Oriental Region.

(ii) GENERIC CHARACTERS.

The species now added to the genus do not call for any modifications of the generic characters given by Frey (1928). The following formal definition may be given:

Cyrtodiopsis Frey.

DIOPSIDAE characterized by a coating of comparatively coarse hairs on most parts of the body. The wings are without an alula; the thorax bears pleurotergal but no supra-alar spines and it is free from bristles; the scutellar spines are strong curved, hairy, occasionally with a very weak bristle or hair terminally situated. The inner orbital bristle is strong. The abdomen is markedly clavate.

GENOTYPE: *Diopsis dalmanni* Wiedemann (1830).

In many respects this genus is intermediate between *Diopsis*, which has straighter scutellar spines and very weak inner orbital bristles, and *Teleopsis*, which has supra-alar spines. Certain species of *Diasemopsis* have been described as hairy, but these all have spines on the ventral surface of the fore-femora and bristles on the dorsum of the thorax.

The following five distinct species fall within the above definition of the genus:

1. *C. dalmanni* (Wiedemann).
2. *C. quinqueguttata* (Walker).
3. *C. whitei* (Curran).
4. *C. currani* sp. n.
5. *C. africana* sp. n.

(iii) KEY TO SPECIES OF *Cyrtodiopsis* (see Plate I, figs. A-G).

1. Head and body mainly black *quinqueguttata* Walker
- Head and body brownish, never black 2.
2. 1st posterior cell (R_5) with no median pale spot *africana* sp. n.
- 1st posterior cell (R_5) with median pale spot 3.
3. This wing spot small, isolated, distinct; the sub-apical brown band on the wing greater than the apical pale bands in width *currani* sp. n.
- This wing spot larger and part of the transverse pale band; the dark sub-apical band on the wing not greater than the apical bands in width 4.
4. Dorsum brown pollinose; inner orbital bristle on a strong tubercle *whitei* Curran
- Dorsum glossy, not pollinose; inner orbital bristle on a weak tubercle *dalmanni* Wiedemann

(iv) DESCRIPTIVE NOTES ON THE SPECIES OF *Cyrtodiopsis*.I. *Cyrtodiopsis dalmanni* (Wiedemann).

- Diopsis dalmanni* Wiedemann, 1830, *Auss. Zweifl. Ins.* 2 : 560.
Diopsis dalmanni Wiedemann, Westwood, 1837, *Trans. Linn. Soc. London*, 17 : 309, 547.
Diopsis attenuata Doleschall, 1856, *Natuurk. Tijdschr. Ned.-Ind.*, 10 : 413.
Diopsis latimana Rondani, 1875, *Ann. Mus. Stor. Nat. Genova*, 7 : 444.
Diopsis lativola Rondani, 1875, *Ann. Mus. Stor. Nat. Genova*, 7 : 445.
Diopsis albimana Rondani (in error for *latimana*), 1875, *Ann. Mus. Stor. Nat. Genova*, 7 : 445.
Diopsis dalmanni Wied., van der Wulp, 1897, *Tijdschr. Ent.*, 40 : 184.
Diopsis dalmanni Wied., de Meijere, 1908, *Tijdschr. Ent.*, 51 : 115.
Teleopsis truncata Brunetti, 1928, *Ann. Mag. Nat. Hist.*, (10), 2 : 277.
Cyrtodiopsis dalmanni (Wied.), Frey, 1928, *Notul. ent. Helsingfors*, 8 : 70.

Of the descriptions listed above, van der Wulp's (in Dutch) and de Meijere's (in German) are so complete that it is not necessary to redescribe this species here.

The species is very variable and this no doubt is responsible for the list of synonyms given above. It is possible that it could be sub-divided into geographical races, but until much longer series are available, such sub-division is not practicable. From the British Museum material, however, it is apparent that there is considerable variation in the wing pattern. Specimens from Java (the type locality) show two forms (Plate I, figs. A, B) with intermediates, while specimens from the F.M.S., Siam and Sarawak (Plate I, fig. E) are slightly different from both—the sub-apical pale band, usually composed of three spots, is absent and the transverse dark band is both darker and wider than usual, thus approaching in form the pattern of *C. currani* sp. n. (Plate I, fig. F).

The variation of this species is being studied biometrically, and series from as many different localities as possible are required, but it is more especially important to know if the species exists in Burma, and if so, in which form it is found.

2. *Cyrtodiopsis quinqueguttata* (Walker).

- Diopsis quinqueguttata* Walker, 1857, *J. Linn. Soc. London*, 1 : 36.
Diopsis villosa Bigot, 1874, *Ann. Soc. Ent. Fr.*, 5 : 4, 114.

This species is readily distinguished from others in the genus by its black appearance—in which it bears a superficial resemblance to *D. subnotata* Westwood, which is found in the same region but which is generically distinct.

Rondani (1875) pointed out that the species he was describing as *D. lativola* sp. n. and which is now regarded as synonymous with *C. dalmanni* (Wiedemann), was apparently related to *D. quinqueguttata* Walker, but he did not give his reasons.

The type of *quinqueguttata* is in fair condition, but it has been thought advisable to give the following re-description from fresh material, collected by *Hobby & Moore* in Sarawak in 1932 and now preserved in the British Museum.

♂ and ♀. Length : 8 mm. Eye-stalk : 5 mm. Wing : 5½ mm.

Head : black, face glossy black, not markedly protuberant, as in *dalmanni* ; epistomium orange, facial teeth absent. The eye-stalks are darker at the base, considerably lighter at the tips except behind the eyes—sparsely hairy all over. Antennae typical in form, brownish with black arista. Inner orbital bristle long, erect, slightly curved ; outer orbital bristle strong and long.

Thorax : dull black with pale pollinose triangular patches just before the wings on the dorsum, also before and behind the wings on the pleura. Collar very pale pollinose. Scutellar spines strong and hairy.

Wing: venation typical, though careful examination of the wing shows that the fifth vein ($M_4 + Cu_1$) and the discal cell (1st M_2) differ slightly from the standard form (see Plate I, fig. D). Wing pattern as follows: distal third dark except for a pale apical spot, middle third not quite so dark with a light spot at the foot of the discal cell and a similar spot on the anterior margin opposite.

Legs: fore coxa pale yellowish, femur yellowish basally, but darker apically and not very incrassate. Tibia black and tarsus, except for 1st segment, light. Middle legs dark brownish except for the apical half of the femur, which is light. Hind legs dark brown except for the basal tenth of the femur, which is distinctly paler.

Abdomen: mainly black with a sparse covering of hairs and with markings as follows: first two segments very pale pollinose, third segment with a pair of clear silvery-white patches on sides, fourth segment pale brown pollinose on most of the basal half and two silver-white patches on the sides. Sixth segment pale pollinose.

3. *Cyrtodiopsis whitei* (Curran).

Diopsis whitei Curran, 1936, *Amer. Mus. Nov.*, 833 : 1.

A single specimen in the British Museum with the following data: "In jungle, Assam-Ganhati 21.x.1920 R. Senior White" agrees exactly with the original description, but unfortunately it has lost its abdomen (Plate I, fig. C). There is nothing to add to the complete description given by Curran.

4. *Cyrtodiopsis currani* sp. n.

D. ferruginea Curran nec Roder, 1936, *Amer. Mus. Nov.*, 833 : 2.

This species is similar to *C. dalmanni* (Wiedemann), but is not so hairy; the wing pattern is slightly different, but the inner orbital bristle is its most distinguishing feature, its structure resembling that of species of *Teleopsis*.

Length: 5 mm. Eye-stalk: 6 mm. Wing: $4\frac{1}{2}$ mm.

♂ and ♀. *Head*: face yellow-brown, darker above the dark transverse suture and black behind the eye-stalk. Antennae pale brown, with pale pilosity, arista long. Inner orbital bristle on short conical base, stout; outer orbital bristle short, erect.

Thorax: brown, darker posteriorly, slightly brown pollinose anteriorly; collar shining brown with dark sutures; scutellum pollinose, scutellar spines basally concolorous with scutellum but darker apically, hairy.

Wing: mainly dark, hyaline at base; tip tinged with brown, a narrow band of three spots separating this from the dark portion of the wing; three median pale spots distinctly separate; a pale band nearer the base (Plate I, fig. F).

Legs: fore coxa and femur reddish brown, tibia much darker, first tarsal segment dull; dark, the remaining segments much lighter. Middle and hind legs similar, femora darkened distally, tibiae very dark brown, tarsi dark with black hairs.

Abdomen: first segment dark brown, second somewhat darker, matt; third light brown basally, darker where it widens; fourth dark brown, nearly black at edges with white spots on either side; fifth and sixth segments blackish brown.

SIAM—Bang Kloi, 19.xi.1933. Holotype, ♂.

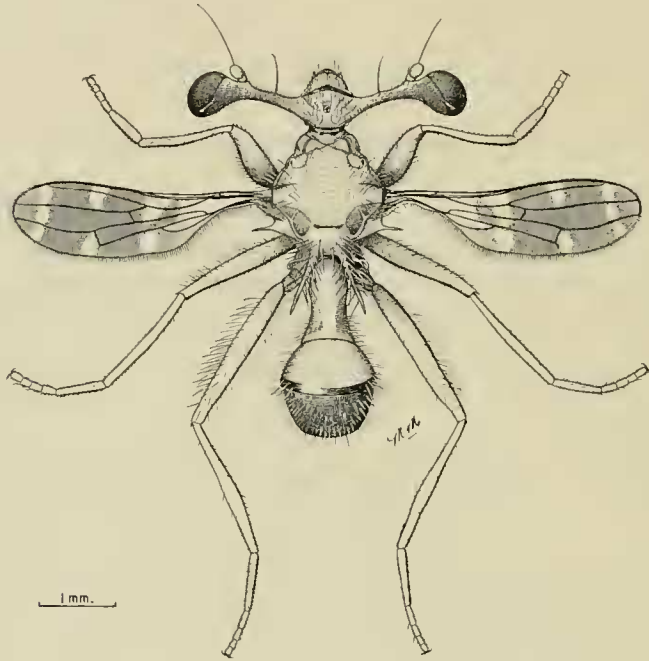
SIAM—Non Guri, 21.xi.1933. Allotype, ♀.

Both collected by W. R. S. Ladell and now in the British Museum.

Cyrtodiopsis africana sp. n. (Text-fig. 6.)

This is the only African species of this genus known at present; it can readily be distinguished from the Oriental species by its much smaller size, and by the form of the wing-markings (Plate I, fig. G), in which it closely resembles *Diopsina ferruginea* Curran (1928a), though this latter species has (as shown by a specimen in the British Museum) setigerous scutellar spines and is generically distinct.

♂ and ♀. Dark reddish brown. Length: about 5 mm. Eye-stalks: 4 mm. Wing: 4 mm.



TEXT-FIG. 6.—*Cyrtodiopsis africana* sp. n.

Head: dark reddish brown and markedly hirsute; upper parts of the face prominent, roughened; lower parts glossy, with two small but distinct teeth. The black suture on the lower side of the eye-stalks extends nearly to the oral margin. Eye-stalks strong, glossy yellow-brown in the middle but darker apically, with a sparse covering of hair on all surfaces. Ocellar spot black, prominent, ocelli showing light by contrast. Inner orbital bristle strong, arising from a small black conical base; outer orbital bristle much stronger but not so long, and with a similar base. Antennae brownish, the third segment covered with fine light-coloured pile.

Thorax: glossy brown, showing the sutures clearly, somewhat darkened; hairs long, black, arranged in rows on dorsum. Pleurotergal spine strong with black tip. Scutellum distinctly convex, deeper than long (as in *Diopsina*, but bearing hairs and not distinct bristles); scutellar spines strong, slightly curved

distally—proximal third light, median third dark, distal third lighter than the middle but darker than the basal third; more than 15 long black hairs on each spine, evenly distributed.

Wing: mainly brown, showing seven clear spots arranged as shown (Plate I, fig. 6) (*cf.* also the illustration of the wing of *Diopsina ferruginea* Curran (1928b: 183), i.e. a subapical row of three contiguous spots, two centrally placed spots, one from the anterior margin crossing the second vein and extending to the third vein; the other on the posterior margin at the end of the discal cell. The other two spots form a nearly complete white band across the basal third of the wing.

Legs: conspicuously hairy; fore: coxa brown, slightly white pollinose on the lower surface, which is somewhat flattened; femur not very incrassate, much darker brown, with black hairs on the ventral surface, which also bears two rows each of five very small teeth on the distal fifth; tibia very dark brown uniform all over; tarsus very dark on dorsal surface, but with a golden pubescence on the underside. Middle legs resemble the hind legs, but have no pubescence on the tarsi. Hind femur dark brown with dark spot apically and a terminal spine; tibia dark brown and tarsus dark on upper surface, golden pubescence on lower.

Abdomen: strongly clavate with terminal segments reflexed under (in dried specimens). First segment slightly pollinose and therefore appears lighter than the body. Second segment brown, blacker towards the edges distally. Third segment glossy brown except on the distal margin, which is dark-banded; this segment is considerably wider distally. Fourth segment appearing more or less hemi-spherical from above, shining dark brown, rather more hirsute than the third segment. Other segments not normally visible.

UGANDA, W.P., Nyakasura, Toro. Holotype, ♂, 29.i.1935.

UGANDA, W.P., Mpanga Bridge, nr. Fort Portal. Allotype, ♀, 5.iv.1936.

Paratype, ♂, same data as holotype.

All collected by the author and now in the British Museum.

In life this Diopsid has a strong resemblance to an ant, the eye-stalks giving the illusion of strong antennae and the wings held flat over the abdomen serve to exaggerate the petiolation—an illusion that is more marked in the case of *D. circularis* Macquart, in which the two circular marks on the wings coincide when the wings are held in their normal resting position.

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PLATE I.

Wing pattern of species of *Cyrtodiopsis*. ($\times 12$.)

- A, B. *C. dalmanni* (Wied.) from Java.
- C. *C. whitei* (Curran).
- D. *C. quinqueguttata* (Walk.).
- E. *C. dalmanni* (Wied.) from Sarawak.
- F. *C. currani* sp. n.
- G. *C. africana* sp. n.